

**REMARKS/ARGUMENTS**

This amendment is filed in response to the Final Official Action of May 31, 2006, relating to the above-identified application. The amendment is presented to further advance the prosecution of this application.

A request for continued examination is also filed herewith.

A three-month request for extension of time, together with the associated fee, is filed herewith.

The Examiner is thanked for his comments regarding the replacement of the formulas on page 2. The foregoing amendment seeks to correct these formulas in accordance therewith.

The rejection of Claims 1, 2, 4, 5, 10 and 11 under 35 U.S.C. § 112 (first paragraph) is traversed and reconsideration is respectfully requested. Claims 1 and 5 have been amended to restate the limitation regarding compacting being carried out by roller compactor or by belt filter press as described in the application. As the application (page 1 line 19-22) shows only hydrophobizing and then compacting by roller compactor or by belt filter press, the claims have been amended to specify that the process consists of hydrophobizing and then compacting by roller compactor or by belt filter press. And it should be mentioned that the claims exclude further milling as mentioned by the Examiner in the Final Office Action. The rejection under 35 U.S.C. § 112 is therefore overcome.

The rejection of Claims 1, 2, 4 and 10-12 under 35 U.S.C. § 102(b) as anticipated, or in the alternative, under 35 U.S.C. § 103(a) as anticipated by the Degussa AG European Patent 0 808 880 A2, as evidenced by the *Hartmann* patent, US 5,959,005, is traversed and reconsideration is respectfully requested.

As noted in the Official Action, *Hartmann* discloses the treatment of a silica identified as "AEROSIL" 200, a pyrogenically produced silica which has been rendered hydrophobic by reaction with hexamethyldisilazane followed by being compressed mechanically. The tamped density of the resulting product ranges from 50 to 300.

As shown in the reference, the pyrogenically produced silica identified by the trade name "AEROSIL R 200" is mixed with water and hexamethyldisilazane and tempered at 140°C. The hydrophobic silanized silica is then compressed on a continuously operating vertical ball mill to approximately 250 grams per liter; see the Example, col. 2.

Additionally, the silica is then ground by an air-jet mill whereby the resulting silica has a tamped density of 188 grams per liter. The "AEROSIL R 200" starts out with a tamped density of 50 grams per liter as shown in the Technical Bulletin pigments No. 63 at page 32.

It can, therefore, be seen that compressing the silica with the vertical ball mill is very effective since the resulting compressed silica displays a tamped density of 250 grams per liter. However, the compressed silica is difficult to redisperse because there is grit in between the particles. Therefore, the silica is ground by an air-jet mill in order to destroy the grit. The resulting silica can be used in a two component RTZ silicon rubber as a filler.

Although the ground silica has been improved due to destruction of grit, another problem has arisen thereby.

Due to the severe mechanical milling and grinding, the secondary (aggregatic) structure of the structure of this silica is destroyed. The result of this is that the silica cannot be used as a thickening agent. In order to point out this distinction more clearly, Claim 1 has been amended

to specify that the silica product is in the form of aggregates. Applicants' method does not destroy the aggregatic structure of the silica.

The *Hartmann* reference discloses a number of advantages of the silica in col. 1, line 47 to col. 2, line 8. However, in that portion of the reference, it is also described that the silica is a low thickening, silanized silica; see col. 1, line 48.

It is noteworthy that *Hartmann* does not disclose any dispersions of the silica. An important feature of the present invention is that the silica of the present invention can be used to make dispersions which are stable, see page 2, lines 22-23 of this application. This desirable characteristic is believed to be due to the unique action of the roller compactor and belt filter press treatments.

Additionally, an important feature of the present invention is the upper limit of the tamped density of 200 grams per liter. If this limit is crossed to a higher value, the silica contains grit which cannot be redispersed any further. The limit of 200 grams per liter is achieved by using the roller compactor or the belt filter press. Accordingly, it can be seen that the silica produced in accordance with the present invention is patentably distinct from the one that is produced by the *Hartmann* process.

In the present application, the advantages of the silicas produced in accordance with the present invention are described on page 2, lines 16-25. It is a characteristic of the silica according to the present invention that it is in the form of relatively small aggregates. This has now been identified in Claim 1. Thus, the dispersions are more finely divided because the silica according to the invention is more readily dispersible. The dispersions produced using the silica according to the invention exhibit a lower Grindometer value. In addition, the ultraviolet

transmission transparency and visual transparency of the dispersions of the present invention is distinctly improved by using the presently claimed silicas.

Dispersions containing the silicas according to the present invention exhibit distinctly increased stability because the tendency towards settling is distinctly lower.

A still further advantage of the present invention is that the silica exhibits reduced dusting during handling and the distinctly reduced incorporation or waiting time in, for example, liquid systems. In comparison with the hydrophobic pyrogenic silica of a lower bulk density; i.e. less than 55 grams per liter; the hydrophobicity of the silica according to the invention is unchanged. Thickening action is also unchanged, see page 3, lines 1-2 of this application.

These advantages and benefits of the present invention could not have been predicted from a consideration of the *Hartmann* patent. It could not be predicted or expected from *Hartmann* that by using a roller compactor or a belt filter press in place of the mechanical means in *Hartmann* that an improvement in the silica could be obtained. Accordingly, applicants respectfully submit that the reference fails to anticipate or render obvious the claimed subject matter.

The rejection of Claims 1, 2, 4 and 10-12 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) in view of the *Nippon* reference (JP 06-087609) is traversed and reconsideration is respectfully requested. The Official Action mentions that the *Nippon* reference discloses hydrophobic pyrogenic silica having a density of 80 to 300 grams per liter and shows in the examples that they have been reacted with a halogen-free silane.

The Japanese reference discloses a fumed silica which is treated with hexamethyldisilazane to become hydrophobic. This product is then pulverized in a ball mill to

obtain a bulk density of 80 to 300 grams per liter. As disclosed, the silica is used as a filling material in resins.

The reference states that the torque should be equal to or lower than 10 kg. cm. This means that the thickening effect should be low. See para. 0002 of the reference.

In para. 0011, it is said that by grinding after carrying out the hydrophobic process, a silica with few aggregates is obtained. Thus, *Nippon* teaches that the product shall have few, if any, aggregates. In contrast applicant's silica is an aggregate product. As shown in para. 0012, it is said that the ground silica does not produce nebula and can acquire low torque.

In para. 0016, the pyrogenic silica which is the AEROSIL R 200 was rendered hydrophobic with trimethylethoxysilane and then ground in a ball mill for two hours. The resulting silica shows a torque value of lower than 9 kg-cm.

In accordance with the present invention, no grinding with a ball mill is used. This means that the aggregate structure of the silica is not destroyed. Claim 1 of the application specifies that the silica is in the form of aggregates. The *Nippon* reference does not disclose a dispersion of the silica in a solvent and is further evidence of the poor dispersability of the *Nippon* product. Accordingly, it is respectfully submitted that the *Nippon* reference fails to anticipate or render obvious the claimed invention.

The rejection of Claim 5 as allegedly obvious in view of the European patent 0 808 880, as represented by *Hartmann*, US 5,959,005, or the Japanese reference, JP 06 08-7609, further in view of *Kingle*, US 4,877,595, or *Reinhardt*, US 3,860,682, is traversed and reconsideration is respectfully requested.

The Official Action relies on three references, the primary teaching of which is to grind the hydrophobic silica with a ball mill. A silica that has been ground by a ball mill and additionally by an air-jet mill cannot be compacted any more because there is no aggregate structure that could be compressed. In contrast, Applicant's claims call for an aggregate product. Moreover, the *Reinhardt* patent, in col. 5, lines 50-54, discloses that the moisture content of the silica should not be below 1%. The AEROSIL R202 silica which is used in accordance with the present invention has a moisture content of less than 0.5% and, therefore, this means that the *Reinhardt* patent teaches away from compacting a pyrogenic silica as defined in the present invention. Accordingly, it can be seen that the references fail to anticipate or render obvious the claimed invention because there is no motivation in any of the references which would lead persons skilled in the art to the realization that there would be a benefit or advantage in carrying out the method of the present invention using a roller compactor or a belt filter press to compact the silane modified silica to obtain a tamped density of 55 to 200 grams per liter and without destroying the aggregate structure thereof.

Filed herewith is a declaration by Günther Michael, one of the inventors, who explains the significance of the aggregate form of the silica. Inventor Michael points out that the silicas of the invention form aggregates and it is the aggregative form of the silica that contributes towards its desirable properties in dispersions.

If the silica is subjected to severe mechanical actions, such as in a ball mill, the aggregative nature of the silica is destroyed and the silica becomes unsuitable for dispersions.

Accordingly, applicants request favorable reconsideration at the Examiner's earliest convenience.

Respectfully submitted,

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